A PREGNANCY RATE COMPARISON USING ASIC'S Ab∑UI™HYDRAULIC INJECTION INSEMINATION SYSTEM

怀孕率比较--使用的 ASIC 的 Ab∑UI™液压注射受精系统

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Introduction
导言

During the last decade, Intra-Uterine Insemination (IUI) has been developed and used both for research and practice on farm. The benefits of using IUI technique are not only to reduce the number of spermatozoa (1-2 x 10^9/dose) used at insemination (getting more sows to be inseminated) but also to diminish semen back flow and sperm losses after insemination. In pigs, it has been shown that the optimal insemination time in order to achieve a good fertilisation rate is within 24 h before ovulation. The ability of a pig oocyte to be fertilised has been considered to be as short as 8-12 h after ovulation. Subsequently, **insemination after ovulation results in impaired farrowing rate and litter size**. **In addition, it is well documented that the sows with a longer weaning-to-oestrus interval (WOI) had a shorter duration of oestrus, consequently had a shorter ovulation time (i.e. a shorter time from standing oestrus to ovulation)**. In other words, sows with a shorter weaning-to-oestrus had a longer duration of oestrus, and consequently had a longer ovulation time. **For that reason, the timing of AI should be adjusted by using the WOI. Nonetheless, this is the first study to be published on the relationship of WOI and timing of AI by using ASIC's Ab∑UI™ Hydraulic Injection Insemination System.** ASIC catheters contain a membrane (see picture) inside a foam tip which enables their catheter to easily go through the cervix by pressurizing a container of semen; **without damaging the cervix**. Therefore, the aim of the present study was to investigate the efficacy of using ASIC's Ab∑UI™ Hydraulic Injection Insemination System on the pregnancy rate after adjusted timing of AI with WOI.

在过去十年中，子宫内人工授精（ IUI ）已开发和使用于研究与农场。的好处，使用 IUI 技术不仅减少精子（ 1-2 x 10^9/剂 ）使用人工授精（越多母猪能受精） ，而且还减少精液的回流量和精子受精后的损失。在猪，它已经表明，最佳受精时间，是排卵前 24 小時内。猪卵母细胞受精一直被视为要排卵后的短短 8-12 小时。因此，排卵后受精，结果会损产仔率和产仔数。此外，如果母猪有较长的断奶至发情週期（ WOI ）, 发情期越短，因此有一个较短的排卵期。换言之，母猪有较短的断奶至发情週期,有更长的发情，因此有一个较长的排卵时间。因为这个原因，授精的时间应予以调整，用 WOI 。不过，这是首次研究发表報告，用 WOI 和 ASIC 的 Ab 授精管系统的关系。ASIC 的授精管，包含膜套（见图片）在海棉头内，把精液施压使他们的导管很容易通过宫颈;而不会损害宫颈。因此，本研究的目的是调查使用 ASIC 的 Ab™液压注射受精系统对怀孕率，經授精与 WOI 调整时间的疗效。

Materials and Methods
材料与方法

Forty crossbred (Landrace x Yorkshire) multiparous sows from a commercial herd with an average parity number of 3.6 ± 1.2 (mean ± S.D.) were used in this study. Prior to this study, the sows had shown a normal reproductive performance. The sows were kept in individual crates and boars were housed in the same stable throughout the experimental period. The sows were fed twice a day. Water was available ad libitum. *Oestrous detection* was performed by inspection of the vulva for reddening and swelling (prooestrus) as well as by control of the standing reflex (oestrus) in the presence of a boar. The oestrous detection was carried out twice daily. *Insemination*, sows were inseminated according to their WOI: 3-4 days, inseminated at 24 h and 36 h after standing oestrus; 5-6 days, inseminated at 12 h and 24 h after standing oestrus; ≥ 7days, inseminated at 0 h and 12 h after standing oestrus. Semen from boars of proven fertility were used during the experimental period. BTS extender was used for semen processing. Forty sows were divided into four groups: Group-A (10 sows): inseminated by using a foam tip (3 x 10^9 Spermatozoa/80ml); Group-B (10 sows): inseminated by using a foam tip (1.5 x 10^9 Spermatozoa/80ml); Group-C (10 sows): inseminated by using Ab∑UI™ catheter (3 x 10^9 Spermatozoa/80ml), Group-D (10 sows): inseminated by using Ab∑UI™ catheter (1.5 x 10^9 Spermatozoa/80ml). The insemination for a foam tip was carried out in the presence of a boar. However, when using Ab∑UI™ catheter, insemination was performed by absent of a boar. All sows were subjected to pregnancy diagnosis on days 20-22 after insemination by using real time ultrasound (50STringa, sector probe with 5 MHz, ESAOTE Pie Medical, The Netherlands).

40 头杂交（长白猪 x 约克郡）从商业畜群的多产母猪与;平均产次数為 3.6 ± 1.2 (mean ± S.D.)用在这个研究。在此研究之前，母猪表现出正常的繁殖性能。在整个实验期间母猪则留在个别档位和公猪被安置在同一农房 。母猪一天喂两次。水是随时可用的。发情检测是由检查外阴变红和肿胀 ，以及在公猪前企立的反应（发情）。发情检测每日进行两次。*人工授精*，被受精的母猪是根据其 WOI ： 3-4 天，受精在发情后 24 和 36 小时; 5-6 天，受精在发情后 12 和 24 小時; ≥七天，受精在发情后 0 和 12 小時。实验期使用的公猪精液都有生育证明。BTS 稀释剂

是用于精液处理。40 母猪分成四组：A 组-（ 10 母猪） ：受精用传统海棉头（3 x 10^9精子量/80ml ） ;B 组-（ 10 母猪） ：受精用传统海棉头（1.5 x 10^9精子量/80 毫升） ;C 组-（ 10 母猪） ：受精用 Ab 授精管（3 x 10^9 精子量/80ml） ，D 组-（ 10 母猪） ：受精用 Ab 授精管（1.5 x 10^9精子量/80 毫升） 。用传统海棉头授精进行時，有一头公猪在場。而用 Ab 授精管時，是沒有公猪在場的。所有母猪授精后 20-22 日受到实时超声的诊断（50STringa, sector probe with 5 MHz, ESAOTE Pie Medical, The Netherlands） 。

Results

结果

The average weaning to oestrous interval was 4.3 ± 0.9 (means ± S.D.) days, with a range of 3-9 days. The pregnancy rates were present in Table 1.

平均断奶到发情週期為 4.3 ± 0.9 (means ± S.D.)天, 从 3 至 9 天。怀孕率分别在表 1 列出 。

Groups 組	Pregnancy diagnosis (sows) 怀孕诊断（母猪）	Pregnancy diagnosis (%) 怀孕诊断（ % ）
A (n=10, 3 x 10^9 sperm/dose) **Foam** A （n=10，3 x 10^9精子/剂量）传统海棉授精管	**9/10**	**90%**
B (n=10, 1.5 x 10^9 sperm/dose) **Foam** B（n=10, 1.5 x 10^9精子/剂量）传统海棉授精管	**8/10**	**80%**
C (n=10, 3 x 10^9 sperm/dose) **Ab∑UI™** C （n=10, 3 x 10^9精子/剂量）Ab 授精管	**10/10**	**100%**
D (n=10, 1.5 x 10^9 sperm/dose) **Ab∑UI™** D（n=10, 1.5 x 10^9精子/剂量）Ab 授精管	**10/10**	**100%**
Overall significance 整体意义	NA	P< 0.05

IUI

ASIC's Ab∑UI™

Discussion and Conclusion

讨论和结论

The present results confirm the previous studies in that a lower dose insemination (1.5 x 10^9 sperm) with Ab∑UI™- catheter does not negatively affect pregnancy rates. **Comparing ASIC's Ab∑UI™ catheters to foam tip catheters, a higher pregnancy rate was found with Ab∑UI™catheters.** This might be due to semen backflow being diminished when using Ab∑UI™catheters. However, further investigation is needed, in order to compare the farrowing rate and litter size. In conclusion, based on this result, the ASIC's Ab∑UI™ catheter can be an alternative IUI catheter for swine industry & also fixed time insemination using WOI as a tool resulted in a satisfy pregnancy rate.

目前的结果证实了以前的研究认为，在低剂量人工授精（ 1.5 × 10^9精子）Ab授精管不产生不利怀孕率的影响。**Ab授精管与传统的授精管比较，Ab授精管产生较高的怀孕率。**这可能是由于使用Ab授精管時，精液回流減少的原因。然而，比较产仔率和产仔数， 进一步的调查是必要的。在结论，在此基础上，Ab子宫内IUI授精管，为养猪业＆定时人工授精，使用WOI作为一种工具，产生了一个满意的怀孕率。

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Experiment I (sperm distribution and fertilisation rate)

实验I （精子的分布和受精率）

Table 1. Distribution of the sows, and numbers (means ± SD) of large follicles, corpora lutea (CL) in the different experimental groups
表 1 。分布的母猪，和数自（中位数 ± SD ）大卵泡，corpora lutea（CL）在不同的实验组

Groups 团体	Catheter 导管	Number of follicles or CL 卵泡数目	Time of surgery 手术时间
I (n=4)	Ab∑UI™-1.5	21.7 ± 0.6*	5-6 h after AI 小時 (授精后)
II (n=5)	Ab∑UI™-3.0	19.2 ± 4.7*	5-6 h after AI 小時 (授精后)
III (n=5)	传统海棉头 -1.5	20.0 ± 3.5*	5-6 h after AI 小時 (授精后)
IV (n=3)	传统海棉头-3.0	20.5 ± 2.4*	5-6 h after AI 小時 (授精后)
V (n=5)	Ab∑UI™-1.5	21.2 ± 1.1	48-72 h**小時 (授精后)
VI (n=5)	Ab∑UI™-3.0	16.3 ± 3.1	48-72 h**小時 (授精后)
VII (n=4)	传统海棉头-1.5	20.3 ± 1.5	48-72 h**小時 (授精后)
VIII (n=4)	传统海棉头-3.0	20.5 ± 3.9	48-72 h**小時 (授精后)

*Numbers of follicles
** First day of standing oestrus = day 0
*卵泡数目
**第一天的发情= 0 天

Table 2. Numbers of sows with oviductal segments containing spermatozoa at 5-6 h after AI
表 2 。母猪数目--输卵管部分含有精子在 5-6 小時 (授精后)

Groups团体	UTJ	Isthmus-P	Isthmus-M	Isthmus-D
Ab∑UI™-1.5 (n=4)	1/4	-	-	-
Ab∑UI™-3.0 (n=5)	3/5	1/5	-	-
传统海棉头-1.5 (n=5)	2/5	1/5	1/5	1/5
传统海棉头-3.0 (n=3)	2/3	-	-	-
Significance 意义	NS	NA	NA	NA

NS = not significant 不显着; NA= not analysis 没有分析;

Table 3. Numbers of oocytes and cleaved oocyte s at 48-72 h after ovulation

表 3 。卵母细胞的数目和 cleaved 卵母细胞在排卵后 48-72 小时

Groups团体	1 cell	2 cell	4 cell	6 cell	8 cell	Total	Oocytes with spermatozoa in the ZP 卵母细胞与精子在 ZP	Fertilised 受精	%
Ab∑UI™--1.5	57	24	8	-	-	89	44/89	89/89	100%
Ab∑UI™--3.0	34*	7	24	2	-	67	2/67	66/67	98.51%
传统海棉头-1.5	27**	9	29	4	-	69	3/69	42/63	66.67%
传统海棉头-3.0	41	16	-	-	-	57	8/57	30/57	52.64%
Significance 意义	NA	NA	NA	NA	NA	NA	NA	P < 0.01	

- = 1 degenerated ; **=7 degenerated
- = 1 腐化; **= 7 腐化

Test for fertlisation rate is significant at P<0.01 (GLM, Univariate analysis of variance, SPSS programme)
测试受育率是显着的在 P < 0.01 （GLM, Univariate analysis of variance, SPSS programme）

Test for both catheter (Ab∑UI™- vs Foam tip) is significant at P < 0.01 (Independent T test, SPSS programme)
两导管的试验（Ab∑UI™ vs 传统海棉头）是显着的在 P < 0.01 (Independent T test, SPSS programme)

Experiment II (%PR, %FR, NTB and NBA)
实验二（怀孕率%，产仔率% ， 总产仔数 和 活仔数）

Table 4. (data from Banglan farm) Percentage of Pregnancy rate (PR), percentage of Farrowing rate (FR), number of total born (NTB) and number of born alive (NBA)

表 4 。 （数据从 Banglan 农场）的百分比怀孕率（ PR ）的百分比，产仔率（FR） ，总产仔数（NTB）及活仔数（ NBA)

Groups組	%PR	%FR	NTB	NBA
Ab∑UI™-1.5 (n=10)	100	80	11.4 + 2.7	9.9 + 2.6
Ab∑UI™--3.0 (n=10)	100	80	13.0 + 2.0	11.5 +1.9
传统海棉头-1.5 (n=10)	80	50	12.8 + 4.4	12.2 + 3.6
传统海棉头-3.0 (n=10)	90	70	11.3 + 4.5	11.9 + 2.6
Significance 意义	NS (P=0.1)	NS (P=0.3)	NS (P=0.3)	NS (P=0.1)

For all the parameters, no extreme significance was found; however, a tendency to improve %PR and %FR "was found" and this is a good thing.
为所有参数，没被发现有极端的意义;然而，一种倾向，以改善PR% ，和FR% "被发现" ，这是一件好事。

Profits and overall farm efficiencies resul ting from increased conception and farrowing rates can be very significant!
利 润 和 农 场 的 整 体 效 率 造 成 的 增 加 ， 怀 孕 和 产 仔 率 ， 可 是 非 常 重 要 的 ！

Non-parametic test, Cochran test, and SPSS programme was used to compare %PR and %FR.
非 参 数 测 试 ， 考 克 兰 测 试 ， 和 SPSS 方 案 是 用 来 比 较 % PR 和 % FR 。

GLM, Univariate analysis of variance, Duncan's test, and SPSS programme was used to compare NTB and NBA
GLM，单因素方差分析，邓肯的测试，和 SPSS 方案是用来比较总产仔数和活仔数

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